

TRANSLATION OF AMENDMENT UNDER PCT ARTICLE 34  
(Original Japanese copy attached)  
AMENDMENT

To: Examiner of the Patent Office

1. Identification of the International Application  
PCT/JP03/13981

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4. Object of Amendment      Claims

## 5. Contents of Amendments

(1) Original claim 1 on page 12 has been amended to recite "A drill bit comprising: a cutting blade chip formed by a cemented carbide block body, the cutting blade chip having a plurality of cutting blades arranged in a circumferential direction of the cutting blade chip to extend radially outward, the cutting blades being each structured to have a cutting edge formed by an edge between a face and a flank of the cutting blades, the cutting edges extending radially outward such that tip ends are positioned on a tip end portion of the cutting blade chip,

wherein a groove is configured to be provided in a center portion of the cutting blade chip in contact with tip ends of the cutting edges such that the groove has an elongated circle shape formed by semicircular portions as viewed in a bottom view and has a bottom, and the tip ends of the cutting edges have pointed portions.

On line 9, page 12, "such that the groove has an elongated circle shape formed by semicircular portions as viewed in a bottom view and has a bottom" has been added.

(2) Original claim 2 on page 12 has been amended to recite " A drill bit comprising a cutting blade chip formed by a cemented carbide block body, the cutting blade chip having a plurality of cutting blades arranged in a circumferential direction of the cutting blade chip to extend radially outward, the cutting blades being each structured to have a cutting edge formed by an edge between a face and a flank of the cutting blades, the cutting edges extending radially outward such that tip ends are positioned on a tip end portion of the cutting blade chip,

wherein a groove is configured to be provided in a center portion of the cutting blade chip in contact with tip ends of the cutting edges such that the groove has a dumbbell shape as viewed in a bottom view and has a bottom, and the tip ends of the cutting edges have pointed portions.

Recitation of "such that the groove has a dumbbell shape as viewed in a bottom view and has a bottom" has been added to original claim 1 on line 9 page 12.

(3) Claim 3 of page 12 has been amended to recite " A drill bit comprising a cutting blade chip formed by a cemented carbide block body, the cutting blade chip having a plurality of cutting blades arranged in a circumferential direction of the cutting blade chip to extend radially outward, the cutting blades being each structured to have a cutting edge formed by an edge between a face and a flank of the cutting blades, the cutting edges extending radially outward such that tip ends are positioned on a tip end portion of the cutting blade chip,

wherein a groove is configured to be provided in a center portion of the cutting blade chip in contact with tip ends of the cutting edges such that the groove has a trefoil shape as viewed in a bottom view and has a bottom, and the tip ends of the cutting edges have pointed portions."

Recitation "such that the groove has a trefoil shape as viewed in a bottom view and has a bottom" has been added to original claim 1 on line 9 page 12.

(4) Claim 4 has been added to recite "The drill bit according to any one of claims 1 to 3, wherein the groove is formed to cross an axis of the drill bit at a substantially right angle, and the groove is structured to have a face of a circular-arc shape as viewed from a side such that a width of the groove increases from a deepest point thereof toward the tip end of the cutting edge.

The feature defined in original claim 2 depends from any one of amended claims 1 to 3.

(5) Claim 5 has been added to recite "The drill bit according to any one of claims 1 to 4, wherein the cutting blades are formed by three cutting blades arranged at uniform intervals in a circumferential direction thereof, the three cutting blades are structured such that the pointed portion of the tip end of the cutting edge of one of the three cutting blades is positioned at one end portion of the groove, and the pointed portions of the tip ends of the cutting edges of remaining cutting blades are positioned at intermediate portions of the groove, and an opposite end portion of the groove is positioned in a concave portion formed between a face and a flank of associated cutting blades."

The feature defined in original claim 3 depends from any one of amended claims 1 to 3 and added claim 4.

## CLAIMS

1. (Amended) A drill bit comprising: a cutting blade chip formed by a cemented carbide block body, the cutting blade chip having a plurality of cutting blades arranged in a circumferential direction of the cutting blade chip to extend radially outward, the cutting blades being each structured to have a cutting edge formed by an edge between a face and a flank of the cutting blades, the cutting edges extending radially outward such that tip ends are positioned on a tip end portion of the cutting blade chip,

wherein a groove is configured to be provided in a center portion of the cutting blade chip in contact with tip ends of the cutting edges such that the groove has an elongated circle shape formed by semicircular portions as viewed in a bottom view and has a bottom, and the tip ends of the cutting edges have pointed portions.

2. (Amended) A drill bit comprising a cutting blade chip formed by a cemented carbide block body, the cutting blade chip having a plurality of cutting blades arranged in a circumferential direction of the cutting blade chip to extend radially outward, the cutting blades being each structured to have a cutting edge formed by an edge between a face and a flank of the cutting blades, the cutting edges extending radially outward such that tip ends are positioned on a tip end portion of the cutting blade chip,

wherein a groove is configured to be provided in a center portion of the cutting blade chip in contact with tip ends of the cutting edges

such that the groove has a dumbbell shape as viewed in a bottom view and has a bottom, and the tip ends of the cutting edges have pointed portions.

3. (Amended) A drill bit comprising a cutting blade chip formed by a cemented carbide block body, the cutting blade chip having a plurality of cutting blades arranged in a circumferential direction of the cutting blade chip to extend radially outward, the cutting blades being each structured to have a cutting edge formed by an edge between a face and a flank of the cutting blades, the cutting edges extending radially outward such that tip ends are positioned on a tip end portion of the cutting blade chip,

wherein a groove is configured to be provided in a center portion of the cutting blade chip in contact with tip ends of the cutting edges such that the groove has a trefoil shape as viewed in a bottom view and has a bottom, and the tip ends of the cutting edges have pointed portions.

4. (Added) The drill bit according to any one of claims 1 to 3, wherein the groove is formed to cross an axis of the drill bit at a substantially right angle, and the groove is structured to have a face of a circular-arc shape as viewed from a side such that a width of the groove increases from a deepest point thereof toward the cutting edge tip end.

5. (Added) The drill bit according to any one of claims 1 to 4, wherein the cutting blades are formed by three cutting blades arranged at uniform intervals in a circumferential direction thereof, the three cutting blades are structured such that the pointed portion of the tip end of the cutting edge of one of the three cutting blades is positioned at one end portion of the groove, and the pointed portions of the tip ends of the cutting edges of remaining cutting blades are positioned at intermediate portions of the groove, and

an opposite end portion of the groove is positioned in a concave portion formed between a face and a flank of associated cutting blades.